

# The MMS FORTH Newsletter

MILLER MICROCOMPUTER  
SERVICES

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## INSIDE MILLER MICROCOMPUTER SERVICES

### FORTHWRITE

We're not done yet, but our new word-processor in MMSFORTH is a beauty! It will have all the features of Radio Shack's SCRIPSIT and Acorn Software's SuperScript, plus other capabilities which should make it your favorite compared to such strong contenders as WordStar, Magic Wand, etc. Yes, it will accept SCRIPSIT and other ASCII text files. Most important to MMSFORTH users, it will continue the MMS tradition of offering source code for your own custom modification needs, as well as the speed and ease of use you have come to expect from THE DATAHANDLER. Speaking of which, FORTHWRITE will also be trained to dip into your DATAHANDLER file for data to insert into its text. Watch this space for further announcements regarding FORTHWRITE.

### MMSFORTH GENERAL LEDGER

We are now completing documentation for a major new General Ledger product which has been running nearly a year on a client basis. The client use includes professional accounting needs for 16 shopping malls and other equally demanding operations, so we think it may meet your needs, too. Expect surprising speed, ease of use, and a great variety of capabilities - much more than our client could achieve on a microcomputer until MMSFORTH was hitched to the task. Look for the MMSFORTH GENERAL LEDGER in several months.

### MMSFORTH AUTO-ASSEMBLER

You know that Forth is fast, and that its Forth-resident Assembler provides still greater speed. MMS is about to market a new kind of utility program to provide the kind of program speed-up you have associated with use of our Assembler code, but without coding in Assembler! In an initial application, running standard high-level MMSFORTH code modules through our new AUTO-ASSEMBLER Utility resulted in a six-times run-time reduction! For most of us Forth programmers, the MMSFORTH AUTO-ASSEMBLER will bring an even greater saving in development time for those very high speed jobs!

## SEE US AT THE FAIR

### IN BOSTON:

My golly, it's that time again! The Northeast Computer Show is scheduled for October 15-18 at the Hynes Auditorium in Boston, Mass. MMS and Forth fans from the MMSFORTH Users Group of Eastern Mass. are hoping you'll stop by Booth 522 to say hello. Perhaps we can tempt you by leaking the information that we will be previewing our new FORTHWRITE word processor, our new MMSFORTH General Ledger System, some DATAHANDLER modifications, the latest Forth games and literature, and that our computers will be talking Forth along with us, thanks to the Type-'N-Talk Speech Synthesizer! See you there?

### AND IN CALIFORNIA:

Again, MMS will participate at the FORML Conference at Asilomar (Pacific Grove, CA) on Wednesday through Friday over the Thanksgiving holiday, and also at the FORTH Convention in Santa Clara on Saturday. The FORML Conference is only for a select few dyed-in-the-wool advanced Forthers, discussing potential changes to Forth itself. The FORTH Convention is for everybody and it's always a good show, so make it if you can! For details, reservations, etc., call the Forth Interest Group at 415/962-8653. (Do any of you love your MMSFORTH enough to consider bringing your computer and helping us demo our newest stuff thousands of miles away from home?)

### DR. DOBBS JOURNAL FEATURES FORTH

Run out to your local newsstand and get the September 1981 issue of DR. DOBBS JOURNAL! It's another special issue on Forth, and you will like it. Unfortunately, all the examples are given in fig-FORTH. (Despite much talk about 79-STANDARD, apparently none of the authors was running it at manuscript time.) MMSFORTH users won't need the Forth applications anyway (a 6502 Assembler and a simple database structure), so relax and read it for its fine analyses of what Forth is - and isn't.

## V2.0 TAPE PUSHED OFF BY OTHER PROJECTS (Editorial)

Like they say, I've got some good news and some bad news. Let's start with the bad.

With disappointment, MMS must withdraw its MMSFORTH V2.0 Cassette project from advertising or any promised delivery date. When we first advertised V2.0 on tape, we anticipated that the Model III would make it a far more popular product than the V1.8 tape (due to inexpensive 1500 baud tape and 48K RAM with options for over 30 block buffers and other goodies!). It sounded good to us, but technical issues appeared far faster than advance orders. We would need separately developed Model I and Model III systems (because the Model I hardware without the Expansion Interface cannot support our interrupt-driven V2.0 system). The demand of you, our customers, is clearly far stronger for disk-based systems and many other projects. We are heeding your message and laying this pet project aside at least for the rest of 1981.

At this time, we estimate that at least five orders at \$1,000 (or a LOT more at \$901) would be needed to reassign a high priority to this project. For the few persons who have been patiently awaiting their cassette-based V2.0, we are cancelling your orders and returning any money which may have been held. We regret any inconvenience this marketing decision may have caused you and hope you will be moving up to disk, where we are delivering the goods!

The good news is related to the bad news. Part of the reason we haven't been able to complete the V2.0 tape project is that we've been working overtime on several more broadly demanded tasks. Two of them, MMSFORTH V2.0 for disk and its accompanying new USERS MANUAL, are out now and the good reviews are still coming in. FORTHCOM is also available and doing fine.

Two less visible projects are in draft form now, and some of you will be joining us in the final shake-out. The buzz words are FORTHWRITE and MMSFORTH GENERAL LEDGER. Both are running quite well and we hope to have beta test site users feeding back information in a few weeks. We also have developed a MMSFORTH AUTO-ASSEMBLER Utility to speed up important Forth routines without needing to learn or worry about Assembler language! Early copies of each should be fanning out this Fall, and you can preview some of the features by reading our INSIDE MMS column herein.

-- A. Richard Miller, Editor 4th Class

### NEW AT MMS

#### NEW BOOK: STARTING FORTH, by Leo Brodie

This is the book on Forth that you've been waiting for! The first hundreds of copies of this exciting new book have arrived at MMS, and it is guaranteed to become the best-seller book on Forth!

Leo Brodie has collaborated with other good Forthers at Forth, Inc. to turn out the definitive book on introductory through rather advanced Forth. Yes, it does treat CREATE (the old <BUILDS> and DOES), it does discuss pictured numeric output formats, it does explain how Forth processes your input, etc., etc. Unlike earlier offerings, this one is very readable and entertaining, to boot. We find it full of useful examples, including some major ones such as a simple file system. Thanks to a heavy leaning toward 79-STANDARD Forth words and some conscious attention from the author and MMS, STARTING FORTH is quite compatible with MMSFORTH. MMS reviewed the manuscript last Spring, to assure that MMSFORTH users would get maximum value from it. While a few differences remain, Leo modified his book in places for us and we modified MMSFORTH V2.0 in places for his book. They are meant for each other and you will agree once you start using them together.

Other Forth books will round out your library, but this one and your MMSFORTH USERS MANUAL will be the two main references you will use in the coming year. MMS stocks this important new book in paperback now, and is expecting the hardcover edition imminently. Order your copy of STARTING FORTH today: \$15.95 paperback or \$19.95 hardcover, plus \$2.00 shipping/handling (Mass. orders add 5% State tax).

MMS probably will stock this one later, but will have to charge more than its present \$2.50 to cover shipping and long-range purchasing. So get it locally now while you can!

## OUR OWN CUBE PUZZLE

```
: CUBE 191 191 191 170 EMIT EMIT EMIT EMIT ;
: CUBES CR 0 DO CUBE LOOP CR ;
```

This short routine may give you some ideas for simple graphics, bar graphs, etc. What ideas can you grow from our seed?

## PERIPHERAL TALK

### SPEAKING FORTH WITH TYPE-'N-TALK

First MMSFORTH Version 2.0, next FORTHCOM, and now we are training Votrax's new Type-'N-Talk Speech Synthesizer to speak naturally in MMSFORTH! The "TNT" is a very well designed and moderately priced piece of hardware compared to all prior speech synthesizers. And, as Forth inventor Charles Moore predicted several years ago, Forth is the best existing general purpose computer language to take advantage of this state of the art technology. MMS is fascinated with its own preliminary results, and invites interested MMSFORTH users to join in.

Speech synthesis is fun and can make an attention-getting display. It also can be very serious business or a major life improvement when applied usefully. For example, speaking computers tell information to astronomers who cannot read displays without requiring a half-hour to allow their eyes to again become dark-adapted. Similarly, they can report important readings to busy surgeons at an operating table. They can allow a blind person to hear and then print text, or one who cannot talk to "type" this voice onto a phone line. (A deaf person could use FORTHCOM to read messages from others, also.) As you can see, some people consider talking computers to be very serious business, indeed!

MMS likes the TYPE-'N-TALK so much we've decided to stock it for resale to you. It's available now for \$375 plus about \$5.00 shipping, and we toss in the following source code for nothing at all. To make it go you need our new FORTHCOM Diskette (\$39.95 plus \$2.00 S/H). If you are running from a Model I, just use your regular RS-232 cable and throw the TERM/COMM switch to the COMM position. If you are using a Model III, you will have to add an adaptor cable for your RS-232 cable (make it with one male and one female DB-25 connector, connecting Pins 7 and crossing Pins 2 and 3).

For fancier Type-'N-Talk operations, we recommend the more complete cable adapter pin-out shown below. It was designed by David Lindbergh (who also Types 'N Talks).

TRS-80		TYPE-'N-TALK	
Pin #	Name	Name	Pin #
1	PGND	PGND	1
2	TD	Cross Pins	2
3	RD	2 & 3	3
4	RTS	CTS	4
5	CTS	RTS	5
7	SGND	SGND	7
8	CD	Cross Pins	8
20	DTR	8 & 20	20
Use DB-25-S		Use DB-25-P	
(Female RS-232 Connector)		(Male RS-232 Connector)	

Courtesy of MMSFORTH author Tom Dowling, here is enough MMSFORTH source code to train the TYPE-'N-TALK to speak any word you send it, any letter of the alphabet, number or common symbol (pronounced Forth style, as in "fetch" for  $\pi$ , etc.). It can even recite the Humpty-Dumpty nursery rhyme which helped many of us learn to speak, too (remember?). Use these six blocks with a precompiled FORTHCOM diskette, on a TRS-80 with the Type-'N-Talk Speech Synthesizer. We recommend that you set the FORTHCOM menu to 1200 baud, and set the TNT's Switch Position 5 to match. Then enter Q to Quit the menu, enter 50 LOAD to load these six blocks, and you're in business!

Your own serious applications may not need much of this code, or may require the creation of other routines based upon them. A careful examination of these blocks will tell you all you need to know for intermediate jobs. The major speaking words we have provided are SPEAK, SPEAK-ALL, ISPEAK, S, PRO, SPEAK-WORD, and SPEAK-BLOCK. We also have provided a rich assortment of demonstration operations. Start by keying in MUG DEMO and pressing Enter. Also try HELP, LETTERS, and HUMPTY. In Block 55, note how we have distorted the spellings of some words to better shape the response of the TNT.

Try some of these words and word combinations with normal spelling, our modified way, and in other ways you choose in order to learn how to voice words on the three levels of increasing preciseness and complexity which the TNT offers: as they come, with simple spelling changes, or as specific combinations of phonemes (the "modular components" of our spoken language). Using the word S to voice any experimental spellings, you can quickly test the simple result from a word and then "fine-tune" it as you wish before incorporating it into stored code.

## INSIDE TRACK (for advanced users)

### HASHCODE ALGORITHM

MMSFORTH Version 2.0 introduces a MMS technique to convert descriptive but bulky Forth wordnames of up to 31 characters into 4 bytes of tightly coded dictionary headers. This efficiency of speed and space permitted MMS to adopt the 79-STANDARD Forth wordset without sacrificing the high level of performance valued by most MMSFORTH users. (Forth, Inc. did not adopt the 79-STANDARD, primarily for this reason.)

At the FORML Conference of November 1980, MMSFORTH author Tom Dowling presented his new hashcode algorithm for this purpose and MMS invited other Forth users to share the method. Tom presented it again at the Rochester, New York meeting in May 1981, and sent a copy of his attached paper to the Forth Interest Group for publication in 4TH DIMENSIONS. We haven't yet seen our brief explanation in print, so here it is.

### HASH-ENCODED FORTH NAME FIELDS

Tom Dowling, Miller Microcomputer Services  
61 Lake Shore Road, Natick, MA 01760 (617/653-6136)

**Problem:** Long names offer uniqueness but cost too much memory.

**Objectives:** Develop an algorithm to encode names in a 4-byte field and still offer sufficient uniqueness and also provide decoding to a recognizable form.

**Method:** The NAME FIELD shall consist of the name length, the first three characters, and a hash character derived from all additional characters in the name. The characters in the NAME FIELD are restricted to the 96 printable ASCII codes. Three ASCII characters treated as base-96 digits require 20 bits; the name length field, limited to 31 characters, requires 5 bits; one bit is required to indicate immediate words; leaving 6 bits for the hash character. This hash character will be chosen from the first 64 printable ASCII codes. This system guarantees that all names which were unique using the older length + first 3 characters will also be unique in this implementation. Duplicate names will be flagged with a warning. An additional feature of the algorithm is that 4-character names are printed in full if the fourth character is from the first 64 ASCII printable characters.

**Practice:** This algorithm has been in use for 6 months and has proven itself to generate practical uniqueness in all applications at MMS and at 20 test sites. User response has been enthusiastic because it adds the descriptive power of long names without excessive overhead.

### SAMPLE BLOCK:

```
0 : TASK ; DECIMAL
1 ( adr of string -- double-word-encoded-representation )
2 : 96* 2DUP 2DUP D+ D+ 2DUP D+ 2DUP D+ 2DUP D+ 2DUP D+ ;
3 : XENCODE >R 0. R@ C@ 3 MIN 1+ R@ + R@ 1+
4 DO 96* I C@ 32 - 0 D+ LOOP R@ C@ 3 >
5 IF 0 R@ C@ R@ + 1+ R@ 4 +
6 DO 2* DUP 63 > IF 1+ THEN I C@ 32 - XOR 63 AND LOOP
7 ELSE 0
8 THEN R> C@ 64 * + 16 * 0 SWAP D+ ;
9 : XDECODE ( Encoded-rep -- ) 3 SPACES 1024 /MOD 4 .R SPACE
10 16 /MOD >R 96 /MOD 32 + EMIT 32 + EMIT 32 + EMIT
11 R> SPACE 32 + EMIT SPACE ;
12 ( Use as XX word )
13 : XX BL WORD XENCODE XDECODE ;
```

### MMS NEEDS YOUR HASHCODE INPUT!

The Version 2.0 hashcode algorithm looks like a breakthrough to MMS, but some other Forth users are very skeptical. We are collecting specific user data now. Please tell MMS if you have experienced any unexpected "Dup-name reports"; if possible, tell us which words coincided, and how often.

## FUN & GAMES

### CRYPTOQUOTE PUZZLE, by Jill Miller

We created this cryptoquote with the MMSFORTH GAMES DISKETTE, and it can help you to solve it!

```
OKJSYM: J LTOOKYCYMSJIZ OIFMS LOPPKFMD QYUFVY XNFVN VJM IYSJFM,
SZOFVJKKZ, 20 KFMYL PH OIFMS FM SNY JRLYMYV PH OJOYI.
- SYN QYUFK' LQ QVFSFPMJIZ.
```

We will be training our smart little talk boxes to get much smarter, so come along on this unusual and useful trip!

#### Block 50:

```
0 ( 08/22/81 TYPE-'N-TALK, 1 of 6 ) : TASK ;
1 (" By T.Dowling, (c) 1981 by Miller Microcomputer Services "
2 : CRS 13 PUTBYT 1000 0 DO LOOP ;
3
4 : SPEAK-IT DUP C@ OVER + 1+ SWAP 1+
5 DO I C@ PUTBYT LOOP CRS ;
6 : CSPEAK-IT R@ SPEAK-IT R@ C@ R> + 1+ >R ;
7
8 : SPEAK ( use in compiling definitions ) STATE C@
9 IF COMPILE CSPEAK-IT 34 WORD C@ 1+ ALLOT
10 ELSE 34 WORD SPEAK-IT
11 THEN ; IMMEDIATE
12
13 : SPEAK-ALL ( speaks each following input line until Break )
14 BEGIN KEY DUP 29 = IF DROP 8 THEN DUP EMIT PUTBYT 0
15 UNTIL ; -->
```

#### Block 51:

```
0 ( 09/05/81 TYPE-'N-TALK, 2 of 6 )
1 : ISPEAK ( Immediate-mode defining word )
2 CREATE 34 WORD C@ 1+ ALLOT DOES> SPEAK-IT ;
3
4 ISPEAK H HUMPTY DUMPTY "
5 ISPEAK K ALL THE KINGS "
6 ISPEAK P "
7 : HUMPTY H SPEAK SAT ON THE WALL " P P
8 H SPEAK HAD A GREAT FALL " P P
9 K SPEAK HORSES AND " K SPEAK MEN "
10 SPEAK COULDN'T PUT " H
11 SPEAK 2 GETHER AGAIN " ;
12 ISPEAK LETTERS A B C D E F G H I J K L M N O P Q R S T U V W
13 X Y Z 0 1 2 3 4 5 6 7 8 9 " ( speaks alphabet & #'s )
14
15 : S ( speaks line or to " ) [COMPILE] SPEAK ; IMMEDIATE -->
```

#### Block 52:

```
0 ( 08/22/81 TYPE-'N-TALK, 3 of 6 )
1 CODE $COMPARE DE POP HL POP BC PUSH M C MOV DE LDAX A B MOV
2 C INR B INR BEGIN HL INX DE INX C DCR =0 IF B DCR 0 HL LXI
3 BC POP =0 IF PSH THEN HL DCX PSH THEN B DCR =0 IF 1 HL LXI
4 BC POP PSH THEN DE LDAX M CMP #0 UNTIL CY IF 1 HL LXI
5 ELSE -1 HL LXI THEN BC POP PSH
6
7 : $! OVER C@ 1+ CMOVE ;
8
9 ASSEMBLER HERE 1+ BEGIN BEGIN HL DAD A ORA =0 RETC
10 RAR NC JMPC XCHG DE DAD XCHG JMP
11 HERE >R 0 DE LXI CALL RET HERE
12 9 MMS , ] SWAP 1+ DUP C, * HERE OVER ERASE ALLOT [ 10 MMS ,
13
14 : $ARRAY CREATE 1+ [ SWAP , ] ;CODE
15 DE LDAX DE INX HL POP DE PUSH R> CALL HL POP DE DAD PSH -->
```

#### Block 53:

```
0 ( 08/22/81 TYPE-'N-TALK, 4 of 6 )
1 0 CONSTANT #CHANGES 13 30 $ARRAY $FROM 13 30 $ARRAY $TO
2
3 : PRO ( PRO forthword desiredword -> )
4 BL WORD OVER $FROM $! BL WORD OVER $TO $! 1+ ;
5
6 0
7 PRO BL BLANK PRO 1- 1MYNUS PRO 2- 2MYNUS
8 PRO DUP DUPE PRO CR CARRIDSRITURN
9 PRO - MYNUS
10 ' #CHANGES !
11
12
13
14
15 -->
```

#### Block 54:

```
0 ( 08/22/81 TYPE-'N-TALK, 5 of 6 )
1 ISPEAK S! STORE " ISPEAK S" QUOTE " ISPEAK S# NUMBER"
2 ISPEAK S$ DOLLAR" ISPEAK S% PERCENT" ISPEAK S& AMPERSAND"
3 ISPEAK S' TICK" ISPEAK S( OPENPEREN"
4 ISPEAK S* TIMES" ISPEAK S= EQUALS" ISPEAK S+ PLUS"
5 ISPEAK S< LESS_THEN" ISPEAK S> GREATERTHEN"
6 ISPEAK S? QUESTION" ISPEAK S: CO LIN" ISPEAK S- DASH "
7 ISPEAK S@ FETCH" ISPEAK S; SEMI CO LIN" ISPEAK S, COMMA "
8 ISPEAK S. DOT" ISPEAK S/ DEVIDE " ISPEAK S) CLOSE PEREN"
9 : SPEAK-WORD ( with special handling of Forth symbols! )
10 DUP C@ OVER + 1+ SWAP 1+ DO I C@
11 DUP 34 = IF S" ELSE DUP
12 ACASE !#$%&'()*+,-<?>:;@,./" S! S# S$ S% S& S' S( S) S* S+
13 S< S> S? S: S- S@ S/ S, S. S)
14 OTHERWISE DUP PUTBYT CASEND THEN DROP
15 LOOP CRS ; -->
```

#### Block 55:

```
0 ( 08/22/81 TYPE-'N-TALK, 6 of 6 )
1 : SPEAK-BLOCK ( n SPEAK-BLOCK -> ) BLOCK
2 BEGIN BL SWAP TOKEN DUP
3 WHILE CR HERE COUNT TYPE 0 #CHANGES 0
4 DO I $FROM HERE $COMPARE 0= IF I + 1+ LEAVE THEN LOOP
5 ?DUP IF 1- $TO ELSE HERE THEN SPEAK-WORD P
6 4000 0 DO LOOP
7 REPEAT DROP ; ( more examples follow: )
8 ISPEAK DEMO EYEAMA TYPE N TALK SPEECH SYNTHESIZER TRAINED TO
9 TALKIN M M S FORTH I WUZ TAUT BY MY FRIENDS DICK AND DJILL
10 MILLER AND TOM DOWLEING "
11 ISPEAK HM HELLO MOTHER, I KNEW ITWUZ U "
12 ISPEAK MUG HELLO THERE FORTHTH USERS "
13 ISPEAK HELP HELLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL I AM BEING HELD
14 PRIZENER INSIDE A T R S ATEY MIKE ROW COMPU TER "
15
```

#### FORTHCOM MANUAL

Beta test site users of FORTHCOM are reminded to return your original diskette, along with \$2.00 shipping/handling, for rewrite to the final version and its manual. (Yes, Virginia, it has its own manual, too!).

If you have a very early copy of that FORTHCOM MANUAL, we now recommend that when you CUSTOMIZE MMSFORTH onto the diskette you set DIRBLK=20 and Auto-command=DIR. This will load the FORTHCOM source blocks automatically upon rebooting, after which you will complete the precompilation in the prior manner.

#### CALLING ALL PERIPHERAL PATCHERS!

Hey, folks, is anybody out there? MMS is looking for Newsletter items concerning your successful V2.0 patches to add such esoteric items as Percom Doublers, Omicron 8" disk drives, and Exatron Stringy Floppies. Others, too. Share your patch and gain the advantage of more MMSFORTH users talking your language!

#### GET-TOGETHER

Share your questions and answers with a MMSFORTH User Group, or contact MMS for help to start one in your metropolitan area. Here is our present list of contacts for local MMSFORTH User Groups:

CA: Earl Mortensen, 974 Pleasant Hill Road, Redwood City 94061 (415/367-9882).  
CA: Ken Nonomura, 416 Duncan Street, Apt. 5, San Francisco 94131 (415/285-5062).  
CA: Morris Herman, 503 Rosario Drive, Santa Barbara 93110 (805/964-7144).  
CA: Rich Royea, 6456 Lubau, Woodland Hills 91367 (213/704-6859).  
FL: Bob Vest, 64 NW 111th Street, Miami Shores 33168 (305/751-7511 eves.).  
IL: Walter Cooper, 5112 West 30th Place, Cicero 60650 (312/656-6183).  
LA: Ed Laughery, 1222 Jason Drive, Denham Springs 70726 (504/665-7537).  
MA: Jim Gerow, 1630 Worcester Road, Framingham 01701 (617/443-9521 x3562 days, 872-1882 eves.).  
MD: Paul van der Eijk, 5480 Wisconsin Avenue #1128, Chevy Chase 20015 (301/656-2772).  
MI: Kim Watt, Box 1013, Berkeley 48072 (313/288-9422).  
MI: Bob Zwemer, 6408 South Washington, Lansing 48910 (517/393-9287).  
NJ: Paul Zucchini, 148 Bertrand Drive, Princeton 08540 (609/452-3585 days, 921-7629 eves.).  
NY: Bernie Golomb, c/o Eagle Jewelry, 201 Canal Street, New York City 10013 (212/966-3414 days).  
TX: Larry Goforth, 10203-J Golden Meadow, Austin 78758 (512/836-0981).  
TX: Jim Shepard, 16210 Arbor Downs Drive, Dallas 75248 (214/661-9702).  
TX: Dan Healy, 11511 Katy Freeway, Suite 150, Houston 77079 (713/496-4660 days).  
WA: Rod Proctor, 13520 N.E. 29th Place, Bellevue 98005 (206/453-0635 days, 883-1923 eves., and MicroNet 70110,402).  
AUSTRALIA: Peter Wragg, 2 Jilba Street, Indooroopilly, Queensland 4068 (07/378-1623, and CL1641 on The Source).  
AUSTRALIA: Dave Dartnall, 20 Eldon Street, Dianella, Western Australia 6062 (09/446-8100).  
CANADA: Kalman Fejes, 1149D Meadowlands Drive East, Ottawa, Ontario K2E 6J5 (613/225-2443).  
ENGLAND: John Newgas, 1 Philip Court, 89 Hornsey Lane, Highgate, London N6 5LN (01/539-7071 days, 348-6518 eves.).  
JAPAN: Akira Akutsu, M.D., 2-176 Issha, Meito, Nagoya, 465.  
WEST GERMANY: Nigel Head, Birngartenweg 93, 6100-Darmstadt

NOTE: Program trading is one popular facet of these meetings, but NOT commercial programs and WITHOUT MMSFORTH SYSTEMS aboard! Promote legitimate sharing, discourage pirating, and take care not to jeopardize your own MMSFORTH serial number.

# MMSFORTH MODIFICATIONS

## PRINTER-DRIVER OPTIONS IN V2.0

Here is an optional version of MMSFORTH's extended printer-driver, on Blocks 30 and 31 on the System Diskette. This new version will output a blank space before outputting any carriage return on an otherwise empty line - a necessity for some Centronics printers. Some other types of printers will run into their own problems with this change, so don't switch unless it seems needed! If you do use it, remember to recompile your Forth to incorporate this new source code by loading Block 15 with the Extended Printer-Driver paren removed. Also, for Model I use replace Block 30's F8 IN and F8 OUT with 37E8 LDA and 37E8 STA, respectively.

### Block 30:

```
0 ( 08/28/81 M.3 Extended Printer Driver - alternate, 1 of 2 )
1 VARIABLE MARGIN 0 MARGIN ! MARGIN >R          DECIMAL
2 0 C, ( 2+ = c# : cur char # ) 0 C, ( 3+ = 1# : our line # )
3 79 C, ( 4+ = c/l: chars/line ) 60 C, ( 5+ = p/p: printed/page )
4 4 C, ( 6+ = ind: indent #chrs ) 66 C, ( 7+ = 1/p: lines/page )
5 HEX
6 LABEL FEED 0A A MVI ( change 0A to 0D for some printers )
7 ( 2+: out ) PSW PUSH BEGIN F8 IN          FO ANI 30 CPI =0 UNTIL
8          PSW POP F8 OUT          RET
9 LABEL RTN  R# 2+ LDA A ORA PSW PUSH A XRA R# 2+ STA PSW POP
10          =0 IF FEED CALL ELSE 0D A MVI FEED 2+ CALL THEN
11 ( 15+: lf ) R# 3 + DUP ( 1# ) LDA A INR ( 1# ) STA A H MOV
12          R# 5 + ( p/p ) LDA A DCR H CMP NC RETC
13 ( 26+: ff ) R# 3 + DUP ( 1# ) LDA A H MOV A XRA ( 1# ) STA
14 ( in hex! ) R# 7 + ( 1/p ) LDA H SUB =0 RETC CY RETC
15          A H MOV BEGIN FEED CALL H DCR =0 UNTIL RET
```

### Block 31:

```
0 ( 08/28/81 Extended Printer Driver - alternate, 2 of 2 )
1 HERE ( spaces )
2 A H MOV R# 2+ DUP ( c# ) LDA H ADD ( c# ) STA H A MOV
3 A ORA BEGIN =0 RETC 20 A MVI FEED 2+ ( out ) CALL H DCR JMP
4 HERE ( char ) SWAP R# 2+ DUP ( c# ) LDA A INR ( c# ) STA
5 A L MOV R# 4 + ( c/l ) LDA A DCR L CMP CY
6 IF RTN CALL R# 6 + ( ind ) LDA OVER ( spaces ) CALL 1 L MVI
7 THEN MARGIN LDA L DCR ( spaces ) =0 CALLC PSW POP PSW PUSH
8 ( 80 CPI NC IF CO CPI CY IF 20 ADI THEN THEN ( Epson graphics )
9 FEED 2+ ( out ) CALL PSW POP HL POP RET
10 HERE ( ctrl ) OD CPI RTN =0 JMPCC OC CPI RTN 26 + ( ff ) =0 JMPCC
11 ( OA CPI RTN 15 + =0 JMPCC ( lf, use for separate LF/CR & chg RTN )
12 HL POP PSW POP HL POP FEED 2+ ( out ) JMP
13 HERE ( print ) HL PUSH PSW PUSH 20 CPI ROT ( char ) NC JMPCC
14 SWAP ( ctrl ) CALL PSW POP HL POP RET
15 CODE PRINT ( print ) HL LXI 15 MMS 4 + ( out-unit ) SHLD NEXT
```

## FLOATING-POINT ARRAYS & 'FRND' ON UTILITIES DISKETTE

Mike Erdmann of Fairmont, Minnesota noticed that we have included some arrays words in the Floating Point Math routines on our MMSFORTH UTILITIES DISKETTE, but that they were not mentioned in the accompanying tables of Floating Point words. You're right, Mike, and we're sorry! Here are the additional definitions which we are including in the next printing:

```
2ARRAY ( n -> addr )      One-dimen. array of n+1 floating #s.
22ARRAY ( n1 n2 -> addr ) Two-dimen. array of floating #s.
4ARRAY ( n -> addr )      One-dimen. array of n+1 dbl-float. #s.
24ARRAY ( n1 n2 -> addr ) Two-dimen. array of dbl-float. #s.
```

22ARRAY was not included in the source code blocks until 08/06/81. You can add it after 24ARRAY on your UTILITIES V1.2 Block 26, as follows:

```
: 22ARRAY OVER 1+ CCONSTANT 1+ SWAP 1+ * 2* 2* ALLOT ;CODE
ELLOC CALL HL DAD HL DAD DE DAD PSW
```

It's easy to define floating-point arrays. For example, to define a 5 by 10 two-dimensional array of double-precision floating point numbers named EXAMPLE:

```
4 9 24ARRAY EXAMPLE
```

As with the integer arrays in MMSFORTH's ARRAYS Extension, the index counts from 0 to 4 and from 0 to 9.

RND, the random number function in MMSFORTH's RANDOM Extension, has a duplicate name in the Floating Point Math routines but they are not duplicate definitions (the latter uses four bytes, not two). You might choose to rename the latter to FRND if the difference becomes critical in some unusual application. We didn't make the change in MMSFORTH because the 4-byte version is equivalent to Level II BASIC's definition of RND and the chance of the two being used together is about nil.

## LAST-ISSUE FOLLOW-UP

### FACTORIAL NUMBERS

In the discussion of the TOWERS OF HANOI program, we promised a solution to another recursive problem, that of calculating factorial numbers, after you tried it yourself. (So don't read this unless you tried it yourself!)

```
: FACTORIAL DUP 2 < IF DROP 1 ELSE DUP 1- MYSELF * THEN ;
```

Try it out with 5 FACTORIAL. and other such actions. Now for next month, how about analyzing and rewriting FACTORIAL for double-precision behavior?...

### DATAHANDLER "TRAILING" MATCH

Advanced users will have added the second item described for Block 29 below, and will have changed 69 to 84 as the test for an entered "T". Others should rewrite our Block 29 and 31 instructions to read:

Block 29: In the definition of STRING, insert T(railing), between L(eading), and P(erfect). On the next line, insert T between AL and P.

Block 30: In the definition of \$COMP, insert the following between \$2 C# = AND and THEN THEN R2:

```
ELSE ?SL 84 = IF DROP I $2 C# RIGHT$ S$2 $COMPARE 0= THEN
```

### SCREEN-SCAN QUICKIE

We forgot to FILL the can of PAINT! The fix is:  
: PAINT 15360 1024 ROT FILL ;



THE LAST WORD: "THE DATAHANDLER is FORTH to none!"  
- Mike Erdmann, Fairmont, Minnesota  
(Ed.: "Aw, FORTHeluvva Mike!")

